

REMARKS

Claim 1 is independent and stands rejected under 35 U.S.C. § 103 as being unpatentable over Wu et al. '281 ("Wu") or Nakajima '118 ("Nakajima") in view of Litwin '047 ("Litwin"). This rejection is respectfully traversed for the following reasons.

As a preliminary matter, it is respectfully submitted that the Examiner has failed to appreciate the *combination* of "a semiconductor chip *including a power semiconductor device constructed by using a wide band gap semiconductor*" as arranged specifically with a heat conducting member. The Examiner relies on the conventional semiconductor packaging disclosed by Wu and Nakajima as allegedly being relevant to the general arrangement of a chip and heat conducting member, but admits that neither Wu nor Nakajima discloses a power semiconductor device. The Examiner relies on Litwin to obviate this deficiency. However, Litwin at best discloses only that power devices are known *individually*. Indeed, as discussed in the "Background Art" section of Applicants' specification, conventional structures used for heat dissipation specifically in power semiconductor devices have particular issues/drawbacks that the present invention can obviate. The Examiner is also directed to MPEP § 2143.01 under the subsection entitled "Fact that the Claimed Invention is Within the Capabilities of One of Ordinary Skill in the Art is Not Sufficient by Itself to Establish *Prima Facie* Obviousness", which sets forth the applicable standard:

A statement that modifications of the prior art to meet the claimed invention would have been [obvious] because the references relied upon teach that all aspects of the claimed invention were *individually* known in the art is *not* sufficient to establish a *prima facie* case of obviousness without some objective reason to combine the teachings of the references. (citing *Ex parte Levengood*, 28 USPQ2d 1300 (Bd. Pat. App. & Inter. 1993)).

In the instant case, even assuming *arguendo* that the cited prior art "teach that all aspects of the claimed invention [are] individually known in the art", it is submitted that such a conclusion "is

not sufficient to establish a *prima facie* case of obviousness" because there is no *objective* reason on the record to combine the teachings of the cited prior art.

Nonetheless, in order to expedite prosecution, claim 1 has been amended to further clarify the distinction between the present invention and cited prior art. Specifically, claim 1 now recites in pertinent part, "wherein the semiconductor apparatus further comprises a second base material made of a metal material and connected to a part of said upper surface of said semiconductor chip, wherein said power semiconductor device is a vertical element ... wherein a part of said second base material is extruded outside said encapsulating material and works as a second external connection terminal." Support for this feature can be found, for example, in Figure 5 of Applicants' drawings illustrating one exemplary embodiment of a second base material 63. It is respectfully submitted that the cited prior art, alone or in combination, does not disclose or suggest such a feature much less said feature in the particular arrangement/configuration set forth in claim 1.

Moreover, as admitted by the Examiner, the cited prior art does not disclose or suggest a power semiconductor device as a vertical element. In direct contrast, both Wu and Nakajima disclose horizontal elements. "All words in a claim must be considered in judging the patentability of that claim against the prior art." *In re Wilson*, 165 USPQ 494, 496 (CCPA 1970). The Examiner merely discounts this feature as allegedly being obvious with the false assumption that a missing feature of the present invention can be ignored based on an alleged lack of criticality. It is respectfully submitted, however, that the Examiner has improperly used the "optimization of ranges" rationale for discounting a *structural* feature. In this regard, if the Examiner intended to take Official Notice that the structural differences between the present

invention and cited prior art are well-known in the art, then pursuant to MPEP § 2144.03, Applicants respectfully traverse such an assertion and request the Examiner to cite a reference in support of his position which shows vertical elements as arranged and configured relative to other elements in the manner set forth in the combination of claim 1 are known (see second paragraph, last three lines of MPEP § 2144.03, which requires the Examiner to cite a reference in support of his allegation of Official Notice when Applicants traverse). Indeed, only Applicants' specification discloses the claimed *arrangement*, and supplies the motivation for providing it within the particular *combination* recited in the claims.

Moreover, it should be noted that there are fundamental differences between horizontal and vertical elements which can affect operation so that neither Wu nor Nakajima would desire a vertical element. For example, in a horizontal element, an electrode is formed only on one side of the main surface of the semiconductor chip. In this configuration, current flows within the one side so that the semiconductor device provides amplification and rectification properties or the like. In this regard, an area in a horizontal element which is active as a semiconductor device is formed only on one side of the main surface, whereby on the opposite side everything can be mounted.

In contrast, according to one aspect of the present invention, the semiconductor device embodies a vertical power element (see, e.g., page 5, line 8; page 25, lines 13-15 of Applicants' specification, "a back electrode 39...provided on the lower face of the N-type drift layer 31"). In this configuration, the vertical element can have electrodes on both sides of the main surface of the semiconductor chip so as to effect a distinct (relative to horizontal element) operational capability and inter-functionality with other elements in the claimed combination relative to the cited prior art.

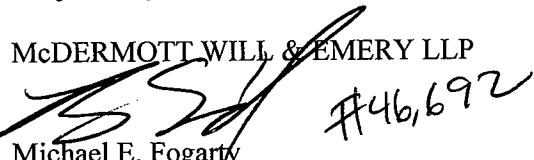
Under Federal Circuit guidelines, a dependent claim is nonobvious if the independent claim upon which it depends is allowable because all the limitations of the independent claim are contained in the dependent claims, *Hartness International Inc. v. Simplimatic Engineering Co.*, 819 F.2d at 1100, 1108 (Fed. Cir. 1987). Accordingly, as claim 1 is patentable for the reasons set forth above, it is respectfully submitted that all claims dependent thereon are also patentable. In addition, it is respectfully submitted that the dependent claims are patentable based on their own merits by adding novel and non-obvious features to the combination. Based on the foregoing, it is respectfully submitted that all pending claims are patentable over the cited prior art. Accordingly, it is respectfully requested that the rejections under 35 U.S.C. § 103 be withdrawn.

CONCLUSION

Having fully responded to all matters raised in the Office Action, Applicants submit that all claims are in condition for allowance, an indication for which is respectfully solicited. If there are any outstanding issues that might be resolved by an interview or an Examiner's amendment, the Examiner is requested to call Applicants' attorney at the telephone number shown below. To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 500417 and please credit any excess fees to such deposit account.

Respectfully submitted,

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